

Serial No. 09/658,732

March 8, 2004

Reply to the Office Action dated June 11, 2003
and the Advisory Action dated December 2, 2003

Page 2 of 9

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claim 1 (previously presented): A field-effect semiconductor device comprising:

a channel layer;

a contact layer;

a semiconductor structure having an electron-affinity different from those of the channel layer and the contact layer and formed between the channel layer and the contact layer, the semiconductor structure having a first junction face between the semiconductor structure and the channel layer and having a second junction face between the semiconductor structure and the contact layer;

an ohmic electrode formed on the contact layer; and

a Schottky electrode formed on the semiconductor structure;

wherein both of the first junction face and the second junction face are iso-type heterojunctions; and

the semiconductor structure is composed of a single material and includes at least two semiconductor layers.

Claim 2 (previously presented): A field-effect semiconductor device according to claim 13, wherein the channel layer and the doped layer of the semiconductor structure at the first junction face are each n-type doped layers, and the contact layer and the doped layer of the semiconductor structure at the second junction face are each n-type doped layers.

Claim 3 (previously presented): A field-effect semiconductor device according to claim 2, wherein the channel layer and the semiconductor structure at the first junction

Serial No. 09/658,732

March 8, 2004

Reply to the Office Action dated June 11, 2003
and the Advisory Action dated December 2, 2003

Page 3 of 9

face each have a dopant concentration of $1 \times 10^{18} \text{ cm}^{-3}$, and the contact layer and the semiconductor structure at the second junction face each have a dopant concentration of $1 \times 10^{18} \text{ cm}^{-3}$.

Claim 4 (previously presented): A field-effect semiconductor device according to claims 1 or 2, wherein the electron-affinity of the semiconductor structure is smaller than those of the channel layer and the contact layer.

Claim 5 (previously presented): A field-effect semiconductor device according to claim 3, wherein the electron-affinity of the semiconductor structure is smaller than those of the channel layer and the contact layer.

Claim 6 (original): A field-effect semiconductor device according to claim 4, wherein the semiconductor structure is composed of AlGaAs.

Claim 7 (original): A field-effect semiconductor device according to claim 5, wherein the semiconductor structure is composed of AlGaAs.

Claim 8 (original): A field-effect semiconductor device according to claims 1, 2 or 3, wherein the channel layer is composed of InGaAs.

Claim 9 (previously presented): A field-effect semiconductor device according to claim 8, wherein the electron-affinity of the semiconductor structure is smaller than those of the channel layer and the contact layer.

Claim 10 (original): A field-effect semiconductor device according to claim 8, wherein the semiconductor structure is composed of AlGaAs.

Serial No. 09/658,732

March 8, 2004

Reply to the Office Action dated June 11, 2003
and the Advisory Action dated December 2, 2003

Page 4 of 9

Claim 11 (canceled).

Claim 12 (previously presented): A field-effect semiconductor device according to claim 14, wherein the channel layer and the doped layer of the semiconductor structure at the first junction face are each n-type doped layers, and the contact layer and the doped layer of the semiconductor structure at the second junction face are each n-type doped layers.

Claim 13 (previously presented): A field-effect semiconductor device according to claim 1, wherein the first junction face between the channel layer and the semiconductor structure and the second junction face between the contact layer and the semiconductor structure are iso-type heterojunctions; the channel layer and the semiconductor structure at the first junction face are each formed of doped layers; the contact layer and the semiconductor structure at the second junction face are each formed of doped layers; and the semiconductor structure includes an undoped layer intermediate the doped layers thereof.

Claim 14 (previously presented): A field-effect semiconductor device according to claim 13, wherein the Schottky electrode is in contact with the undoped layer.

Claim 15 (previously presented): A field-effect semiconductor device comprising:
a channel layer;
a contact layer;
a semiconductor structure having an electron-affinity different from those of the channel layer and the contact layer, the semiconductor structure having at least two layers;

Serial No. 09/658,732

March 8, 2004

Reply to the Office Action dated June 11, 2003

and the Advisory Action dated December 2, 2003

Page 5 of 9

an ohmic electrode formed on the contact layer; and
a Schottky electrode formed on the semiconductor structure; wherein
the semiconductor structure is formed between the channel layer and the contact layer,
and where a junction between said layers of the semiconductor device is a
heterojunction, the junction is an iso-type heterojunction.